REMARKS/ARGUMENTS

Claims 3-6, 11-14, 16, 19, 20, 23, 24, and 26-30 are pending.

Response to Rejections

Claims 3-6, 11-14, 16, 19, 20, 23, 24, and 26-30 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 6,098,568 in view of Patrick et al.

Claims 3-6, 11-14, 16, 19, 20, 23, 24, and 26-30 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 6,041,734 in view of Patrick et al.

Applicants hereby submit a terminal disclaimer in response to these double patenting rejections.

Claims 3, 4, 6, 11-14, 16, 19, 20, 24, 26, 28, and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Arami et al. in view of Patrick et al.

Applicants respectfully submit that independent claim 11 is patentable over Arami et al. and Patrick et al. because, for instance, they do not teach or suggest an impedance monitor comprising a first impedance probe electrically coupled to said high frequency electrode to measure the impedance at the HF electrode and a second impedance probe electrically coupled to said low frequency electrode to measure the impedance at the LF electrode.

The Examiner recognizes that Arami et al. does not teach the impedance monitor as recited in claim 11. The Examiner alleges that Patrick et al. discloses an impedance monitor 202 having a first impedance probe electrically coupled to an electrode to measure the impedance at the electrode, and that it would have been obvious to use the Patrick impedance monitor coupled to each of the low and high frequency electrodes of Arami et al. The Examiner alleges that the motivation for using the Patrick impedance monitor electrically coupled to each of Arami's low and high frequency electrodes is directed to providing a chamber impedance measurement and control for uniform processing as taught by Patrick at column 5, line 57, to column 6, line 33.

Applicants note, however, that Patrick et al. is completely devoid of any suggestion for providing two impedance probes electrically coupled to two separate electrodes. Significantly, the plasma chamber 104 in Patrick et al. includes two electrodes 112 and 114. Column 6, lines 60-64. However, Patrick et al. does not disclose two impedance probes electrically coupled to the two electrodes 112 and 114. Given that Patrick et al. does not teach or suggest using two impedance probes electrically coupled to the two electrodes 112 and 114 in its plasma chamber 104, there is no basis for asserting that combining Patrick et al. with Arami et al. would somehow motivate one of ordinary skill in the art to use two impedance probes.

Furthermore, the two impedance probes as recited in claim 11 are novel and produce new and unobvious results. Measuring the impedance separately at the HF electrode and at the LF electrode can provide important information regarding the system and the process. For instance, the specification at page 25, line 25 to page 27, line 14 (Figs. 8-10) describes the use of independent impedance measurements at the HF and LF electrodes in conjunction with other measurements such as phase angle and current intensities to analyze the effects on ion bombardment, wet etch rate, and other film properties. Thus, the claimed system produces new and unobvious results.

The presence of new and unobvious results provides an additional and independent ground for distinguishing over the cited art. The use of two impedance probes is neither taught nor suggested in the cited references. This claimed feature clearly distinguishes over the cited art.

For at least the above reasons, Applicants respectfully submit that independent claim 11, and claims 3, 4, 6, 12-14, 19, 28, and 29 depending therefrom, are patentable.

Applicants respectfully submit that independent claim 16 is patentable over Arami et al. and Patrick et al. because, for instance, they do not teach or suggest a matching network electrically coupled to a high frequency RF generator and the gas manifold, wherein the matching network has capacitors that are different than the variable capacitor which is electrically coupled to the chamber and controllably coupled to the processor wherein the

processor adjusts a capacitance level of the variable capacitor to vary the impedance of the plasma in response to an output of the impedance monitor.

The Examiner recognizes that Arami does not teach capacitors in the matching networks, but alleges that Patrick et al. discloses such capacitors. The Examiner does **not** allege that the capacitors in Patrick et al. are different from a variable capacitor which is electrically coupled to the chamber and controllably coupled to the processor wherein the processor adjusts a capacitance level of the variable capacitor to vary the impedance of the plasma in response to an output of the impedance monitor. In fact, the Examiner states at page 2, lines 12-13 of the Office Action: "Neither Arami nor Patrick teach a variable capacitor separate from the matching network."

For at least the foregoing reasons, claim 16 and claim 24 depending therefrom are patentable.

Applicants respectfully contend that independent claim 20 is patentable over Arami et al. and Patrick et al. because, for instance, they do not teach or suggest a matching network coupled between a low frequency RF generator and the variable capacitor, wherein the matching network includes capacitors that are different than the variable capacitor which is electrically coupled to the LF electrode and controllably coupled to the processor wherein the processor adjusts a capacitance level of the variable capacitor to vary the impedance of the plasma in response to an output of the impedance monitor. As discussed above, the Examiner states at page 2, lines 12-13 of the Office Action: "Neither Arami nor Patrick teach a variable capacitor separate from the matching network."

For at least the foregoing reasons, claim 20 and claim 26 depending therefrom are patentable.

Claims 5, 27, and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Arami et al. in view of Patrick et al., and further in view of Boys et al. Claims 5 and 27 depend from claim 11. Claim 30 depends from claim 16. The Examiner cites Boys et al. merely for allegedly disclosing a pressure control system based on measured plasma attributes.

Applicants note that Boys et al. does not cure the deficiencies of Arami et al. and Patrick et al. As discussed above, Arami et al. and Patrick et al. fail to teach or suggest the features recited in independent claims 11 and 16. Accordingly, claims 5, 27, and 30 are patentable over the cited references at least due to their dependency from independent claims 11 and 16, respectively.

Claim 23 depends from claim 11, and stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Arami et al. and Patrick et al., and further in view of Yamagata et al. (USP 5,362,358) The Examiner cites Yamagata et al. for allegedly disclosing variable capacitors 24, 26 separate from the matching network 22 of a plasma processing chamber.

Yamagata et al. discloses variable capacitor 24, 26 which "are controlled such as to apply RF power only to the anode 12" or "solely to the cathode 14" (col. 1, lines 49-59). Nothing in Yamagata et al. discloses or suggests a variable capacitor electrically coupled to the chamber and controllably coupled to the processor wherein the processor adjusts a capacitance level of the variable capacitor to vary the impedance of the plasma in response to an output of the impedance monitor.

Furthermore, the Examiner has not pointed to any motivation to combine Yamagata et al. with Arami et al. and Patrick et al.

For at least the foregoing reasons, claim 23 is patentable over the cited references.

Rebuttal to Response to Arguments

The Examiner concedes that Patrick et al. does not teach the first and second impedance monitors, but alleges that the duplication of parts is obvious in view of *In re Harza*, 124 U.S.P.Q. 378 (C.C.P.A. 1960).

The Examiner first raised this argument **almost three years ago** in the Interview Summary mailed August 9, 2000, but did not mention it again after Applicants filed a response on September 22, 2000. After trying different combinations of references and arguments, the Examiner now returns to the same inapposite argument.

Harza does not support the Examiner's conclusion. First, Patrick et al. fails to disclose even one, much less two, impedance probes for measuring the impedance at an electrode as claimed. *Harza* stands for the proposition that mere duplication of parts has no patentable significance, provided that the prior art discloses the part. In *Harza* the part is a rib on a web of a water stop. In the present case, the part is an impedance probe that measures the impedance at an electrode. Claim 11 recites a first impedance probe to measure the impedance at the HF electrode and a second impedance probe to measure the impedance at the LF electrode. Patrick et al. discloses a power sensor (202) for measuring the RF power delivered to the plasma chamber (104) (col. 7, lines 14-15). Patrick et al. states that the "sensor may also measure the voltage, current and phase angle at the chamber electrode, and measure the chamber impedance as desired" (col. 4, lines 26-28). The power sensor in Patrick et al., however, does not measure the impedance at the LF electrode or at the HF electrode. Patrick et al. does not disclose the impedance probe as recited in claim 11. Therefore, the recitation of first and second impedance probes in claim 11 does not constitute mere duplication of a part disclosed in the prior art.

Furthermore, the two impedance probes as recited in claim 11 are novel and produce new and unobvious results. *Harza* states that "mere duplication of parts has no patentable significance unless a new and unexpected result is produced." *Id.* at 380. The court in *Harza* found claims 7 and 10 patentable for reciting "the combination of a plurality of ribs in the offset position." *Id.* at 381. The court reasoned that "the offsetting in combination with the claimed dimensional relationship of the ribs produces new and unobvious results which are not suggested by any combination of the references." *Id.* Similarly, nothing in Patrick et al. or the other cited references suggests measuring the impedance at the HF electrode with one impedance probe and measuring the impedance at the LF electrode with another impedance probe.

Measuring the impedance separately at the HF electrode and at the LF electrode can provide important information regarding the system and the process. For instance, the specification at page 25, line 25 to page 27, line 14 (Figs. 8-10) describes the use of independent impedance measurements at the HF and LF electrodes in conjunction with other measurements

such as phase angle and current intensities to analyze the effects on ion bombardment, wet etch rate, and other film properties. Thus, the claimed system produces new and unobvious results.

The Examiner further alleges that it is well demonstrated by Patrick et al. with the impedance measurement of one electrode using one impedance probe at column 7, line 61 to column 8, line 4, that measuring the impedance separately at the HF electrode and at the LF electrode can provide important information regarding the system and the process. The Examiner, however, fails to recognize that Patrick et al. does not disclose even one impedance probes for measuring the impedance at an electrode. The Examiner has **not** identified any impedance probe in Patrick et al.

The Examiner's response to the argument for patentability of claim 16 is equally baffling. Claim 16 stands rejected as being unpatentable over Arami et al. in view of Patrick et al. The Examiner admits that neither Arami nor Patrick teach a variable capacitor separate from the matching network, but states that the limitation is met by Yamagata et al. However, the rejection of claim 16 does **not** include Yamagata et al. In any event, Yamagata et al. does not supply the missing teaching.

The Examiner further alleges that the motivation to add a variable capacitor in Patrick et al. separate from the matching network of a plasma processing chamber is provided in Yamagata et al. at column 1, lines 45-47, which is drawn to controlling the amount of power applied to each of the electrodes in the plasma reactor. The fact remains that nothing in Yamagata et al. discloses or suggests a variable capacitor electrically coupled to the chamber and controllably coupled to the processor wherein the processor adjusts a capacitance level of the variable capacitor to vary the impedance of the plasma in response to an output of the impedance monitor. Thus, there is no motivation to combine the references in the manner suggested by the Examiner.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

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